

REMARKS

This response is intended as a complete response to the Final Office Action dated July 27, 2007. In view of the following discussion, the Applicants believe that all claims are in allowable form.

CLAIM REJECTIONS**A. 35 USC §103 Claims 1-2, 4-8, 17-19, 21-22, and 26-30**

Claims 1-2, 4-8, 17-19, 21-22 and 26-30 stand rejected under 35 USC §103(a) as being unpatentable over United States Patent 6,774,045, issued August 10, 2004 to *Liu, et al.* (hereinafter *Liu*) in view of United States Patent 6,171,982, issued January 9, 2001 to *Byun* (hereinafter *Byun*). The Applicants respectfully disagree.

Independent claims 1 and 21 recite limitations not taught or suggested by any combination of the cited art. *Liu* discloses a method for reducing halogen gases and byproducts in post-etch applications. (*Liu*, Abstract.) Specifically, *Liu* discloses the use of a high temperature ashing process using O₂/N₂ for a short time, or at lower temperatures for a longer period of time. (*Id.*, Summary of Invention.) The process may be used in post polysilicon etch applications. (*Id.*, col. 2, ll. 34-39.)

As the Examiner admits, *Liu* fails to disclose heating the etched substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen, as recited in claims 1 and 21. (Final Office Action, p. 3, ll. 6-7.) However, the Examiner cites *Byun* to assert a teaching of heating a substrate at a temperature of below 500°C in a non-plasma gas mixture comprising oxygen and nitrogen in order to passivate the exposed surface of the substrate. (*Id.* at 8-10, citing *Byun*, col. 8, ll. 19-44, col. 11, ll. 25-32.) The Examiner further contends that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify *Liu* in view of *Byun* because the teachings of *Byun* will passivate the exposed surface. (*Id.* at 10-13.) The Applicants respectfully disagree.

Byun teaches a method of fabricating an electrode passivation layer having improved corrosion and oxidation resistance. (*Byun*, Abstract.) At the location cited by the Examiner, and elsewhere, *Byun* teaches subjecting a substrate to a rapid thermal annealing process in the presence of N₂ containing 10% O₂ to form a passivation film 17 that covers the entire substrate, including at the interface of a tungsten film and an insulating film, on the sides of the tungsten film and a gate electrode. (*Id.*, col. 8, ll. 19-27; Figure 6.)

Thus, *Byun* teaches a method of forming a passivation film that covers the entire substrate. However, a modification of the teachings of *Liu* to form such a passivation film, as asserted by the Examiner, would cover any post-etch residues that are intended to be removed and would prevent the subsequent plasma process from removing the halogen-containing residues. Accordingly, one skilled in the art at the time the invention was made would not have combined the cited teachings of *Byun* with that of *Liu* because the modification would render the process of *Liu* unsuitable for its intended purpose (e.g., the modification would encapsulate the halogen-containing residues and would prevent their removal). (see, e.g., MPEP §2143.01 V.)

As such, the combination of *Liu* and *Byun* fails to teach or suggest a method for removing a halogen-containing residue including heating the substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in independent claims 1 and 21. Therefore, a *prima facie* case of obviousness has not been established as the cited art is not combinable in a manner that yields the limitations recited in the claims.

Thus, claims 1-2, 4-8, 17-19, 21-22 and 26-30, are patentable over *Liu* in view of *Byun*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

B. 35 USC §103 Claims 3, 11-12, 23, and 35-42

Claims 3, 11-12, 23, and 35-42 stand rejected under 35 USC §103(a) as being unpatentable over *Liu* and *Byun* and as applied to claims 1-2, 4-8, 17-19, 21-22, and 26-30, and further in view of United States Patent 5,545,289, issued August 13, 1996 to *Chen, et al.* (hereinafter *Chen*). The Applicants respectfully disagree.

Independent claims 1 and 21 recite limitations not taught or suggested by any permissible combination of the cited art. The patentability of claims 1 and 21 over *Liu* and *Byun* has been discussed above. *Chen* is cited to show a microwave plasma source and various process conditions. However, *Chen* fails to teach or suggest heating an etched substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen, and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in claims 1 and 21. As such, any combination of *Chen* with the teachings of *Liu* and *Byun* would still fail to yield a process that would result in the limitations recited in independent claims 1 and 21. Therefore, a *prima facie* case of obviousness has not been established as the combination of the cited references fails to yield the limitations recited in the claims.

Thus, claims 3, 11-12, 23, and 35-42 are patentable over *Liu* and *Byun* as applied to claims 1-2, 4-8, 17-19, 21-22, and 26-30, and further in view of *Chen*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

C. 35 USC §103 Claim 25

Claim 25 stands rejected under 35 USC §103(a) as being unpatentable over *Liu* and *Byun* and as applied to claims 1-2, 4-8, 17-19, 21-22 and 26-30, and further in view of United States Patent 6,133,102, issued October 17, 2000 to *Wu* (hereinafter *Wu*). The Applicants respectfully disagree.

Independent claim 21, from which the above-rejected claim depends, recites limitations not taught or suggested by any permissible combination of the prior art. The patentability of claim 21 over *Liu* and *Byun* has been discussed

above. *Wu* is cited to show etching a polysilicon layer using a halogen gas in addition to hydrogen gas. However, *Wu* fails to teach or suggest a modification of the teachings of *Liu* and *Byun* in a manner that would yield ...heating the substrate to a temperature of at least 50°C in a non-plasma gas mixture comprising oxygen and nitrogen, and exposing the heated substrate to a plasma that removes the halogen-containing residue, as recited in claim 21. Therefore, a *prima facie* case of obviousness has not been established as the combination of the cited references fails to yield the limitations recited in the claim.

Thus, claim 25 is patentable over *Liu* and *Byun* and as applied to claims 1-2, 4-8, 17-19, 21-22 and 26-30, and further in view of *Wu*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

ALLOWABLE SUBJECT MATTER

The Applicants thank the Examiner for his comments regarding the allowability of claims 9, 13-16, 20, and 31 if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicants further thank the Examiner for his comments regarding the allowance of claims 43-50.

However, in view of the above discussion, the Applicants believe that all claims are presently in condition for allowance. Accordingly, the Applicants respectfully request allowance of all claims in the application.

CONCLUSION

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both further consideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Alan Taboada at (732) 935-7100 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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